MYCOTAXON

Volume 107, pp. 413–417 *January–March 2009*

Sarcogyne magnispora (*Acarosporaceae*), a new species in the *nivea* group from Turkey

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Abstract — A new species of *Sarcogyne* in the calcareous *nivea* group is described from the uplands of central Anatolia, Turkey. It is distinguished from other species in the group by its larger ascospores.

Key words — *Ascomycota*, lichens, taxonomy

Introduction

Sarcogyne Flot. (*Acarosporaceae*) is a genus of lichens distinguished by polyspory, hyaline simple ascospores, and a non-amyloid tholus, occurring on acidic or calcareous rocks that is currently separated from *Acarospora* by the lack of a thalline margin. The type species of the genus *Sarcogyne* is *S. corrugata* Flot., a synonym of *S. clavus* (DC.) Kremp. (Jørgensen & Santesson 1993). The core group of species, *Sarcogyne* sensu stricto, includes such species as *S. algoviae* H. Magn., *S. privigna* (Ach.) A. Massal., *S. reebiae* K. Knudsen, and *S. lapponica* (Ach. ex Schaer.) K. Knudsen & Kocourk., which all have a carbonized proper exciple in which the excessive build-up of pigmentation obscures the hyphae of the margin. *Sarcogyne* sensu stricto, however, lacks the buildup of carbonized accretions on the epihymenial surface that occurs in the species that Vězda (1978) grouped in *Polysporina*. The genus is badly in need of a revision using molecular data to evaluate morphological data and to form natural genera. For

Table 1. Comparison of the members of the *nivea* group.

Species	*Thallus*	*Apothecia (mm diam.)*	*Hymenium (µm)*	*Ascospore size (µm)*
S. algerica	Present	0.7–1.5	85–100	5–7 × 3–3.5
S. cretacea	Present	0.5–0.8	100–120	4–5.5 × 2–3
S. distinguenda	Present	0.6–2.0	110–180	3–4.5 × 3–3.5
S. fallax	Absent	0.7–1.0	110–150	3–5.5 × 3–4
S. magnispora	Present	1.0–2.0	140–200	10–11 × 6–7
S. nivea	Present	0.3–0.6	80–100	(3.5–)4–5.5 × 3–3.5
S. polackiana	Present	0.4–0.5	65–80	5–7(–8) × 3–3.5

example, Reeb (Reeb et al. 2004) found that *Sarcogyne regularis* Körb. was closely related with *Acarospora glaucocarpa* (Ach.) Körb., which raises the question whether at least part of *Sarcogyne* should be included in a new segregate genus containing related species both with and without a thalline margin.

The *Sarcogyne nivea* group is morphologically similar to the *S. regularis* group in having a non-carbonized exciple, hyaline hypothecium, and in occurring on calcareous substrates (Magnusson 1935, 1937, Clauzade & Roux 1985, Knudsen & Standley 2008). The *nivea* group, which is artificially differentiated from the *regularis* group strictly for purposes of specimen identification, is distinguished by having broadly ellipsoid to globose ascospores while the *regularis* group has ellipsoid ascospores. Members of the *nivea* group as treated here include *S. algerica* H. Magn., *S. cretacea* Poelt, *S. distinguenda* Th. Fr., *S. fallax* H. Magn., *S. nivea* Kremp., and *S. polackiana* (Müll. Arg.) H. Magn. All of these species have an epilithic thallus except for *S. fallax*. But, *S. arenosa* (Herre) K. Knudsen & Standley and *S. latericola* J. Steiner of the *regularis* group have epilithic thalli too. The table of main characters in the *nivea* group (Table 1) suggests the possibility that some species are synonyms. Thickness of thallus, paraphyses width, and the number of ascospores per ascus are not included in the table, but with further study may help to morphologically better distinguish species. For instance *S. cretacea* has a thallus of 5 mm thick, while the thalli of other species are thin or lacking in *S. fallax* and that is obviously an important primary character.

Material and methods

The type of the new species is deposited in the lichen herbarium of Erciyes University, Biology Department (Kayseri, Turkey). Hand sections were studied in water, potassium hydroxide (KOH), Lugol's (IKI) and lactophenol cotton blue. Measurements were made in water. Ascospore measurements are given as (X – SD) –X– (X + SD) with X ± SD.

The species

Sarcogyne magnispora K. Knudsen & Halıcı, **sp. nov.**
MycoBank MB 512712

Similis Sarcogyne niveo *agg., sed differt ascosporis majoribus (8.8)–10–(11.2) × (5.2)–6.1–(6.9) µm.*

Type specimens: Turkey, Sivas, Gürün District, Gökpınar, 38°39.251'N, 37°18.108'E, alt. 1550 m, on exposed calcareous rocks, 09 August 2008, leg. M. Kocakaya (MGH 0.5493 – **holotype**; UCR– **isotype**).

Etymology: The epithet "*magnispora*" refers to the large ascospores.

Description: Thallus white, epilithic, ecorticate and poorly stratified, to over 2 cm in width with abundant superficial apothecia, mostly 200–300 µm thick, hyphae obscure in water, 2 µm thick, becoming gelatinized, and intermixed with abundant crystals positive in polarized light and not dissolving in KOH. Algal layer discontinuous, photobiont chlorococcoid green alga, cells mostly 5–10 µm in diameter. Apothecia superficial, black, with distinct proper margin becoming almost excluded, convex to very convex, rarely dividing, 1–2 mm in diameter, sometimes forming a short stipe. Disc black, epruinose, not changing color when wetted. Exciple reddish-brown, 50–90 µm thick, composed of radiating hyphae, inspersed with crystals. Epihymenium reddish-red, 8–10 µm thick, conglutinated. Hymenium 120–200 µm high, orange in thick section, hyaline to slightly yellowish in thin section, conglutinate in water, but spreading easily in squash, paraphyses 2–3 µm wide, septate, not branching, apices slightly expanded in thick dark reddish gel. Asci clavate, 80–100 × 20–35 µm, mostly 50 ascospores per asci. Ascospores (8.8)–10–(11.2) × (5.2)–6.1–(6.9) µm ($n = 20$). Subhymenium about 10 µm thick, obscure. Hypothecium ochraceous, appearing dark under the microscope but not carbonized, actually hyaline but obscured by abundant crystals, hyphae continuous with exciple and thallus, mostly thin-walled, 2 µm thick. Conidiomata not observed.

Ecology, Substrate and distribution: On exposed calcareous rock at an elevation of 1562 meters. Gürün District, where the holotype was collected, belongs to Sivas Province and, is situated in the Irano-Turanian phytogeographical region. In the area, marly hills are pre-dominant. So far known only from type locality in the uplands of Central Anatolia, Turkey.

Discussion: *Sarcogyne magnispora* is obviously a member of the *nivea* group as understood in this paper. It has an uncarbonized exciple, a hyaline hypothecium, occurs on a calcareous substrate, and has broadly ellipsoid ascospores. It has a thin thallus like most species in the *nivea* group, except *S. cretacea*, which has a thallus 5 mm thick and *S. fallax,* which lacks a thallus. The apothecia of *S. magnispora* are the largest in the group and are 2 mm in diameter when fully developed. The other members of the group have apothecia

1 mm or less in diameter except for *S. algerica,* which has apothecia up to 1.5 mm in diameter. The hymenium of *S. magnispora* is from 120 µm to as tall as 200 µm, and overlaps with ranges of *S. distinguenda* and *S. fallax* both which have smaller ascospores than *S. magnispora* [3–4.5 × 3–3.5 µm and 3–5.5 × 3–4 µm respectively vs. (8.8)–10–(11.2) × (5.2)–6.1–(6.9) µm]. As can be seen in Table 1, *S. magnispora* has the largest ascospores in the whole group.

The only species described in the genus with similarly large ascospores is *Sarcogyne oligospora* H. Magn. with ascospores 7–10 × 4–5 µm according to Magnusson (1952). This species has carbonized accretions of the epihymenium and thus following current generic concepts was transferred to *Polysporina* (Knudsen & Lendemer 2005). In the revision of *P. oligospora* (H. Magn.) K. Knudsen by K. Knudsen & J. Kocourková (in prep.), using ample isotype and topotype material from COLO, it was found that mature ascospores were actually much smaller (mostly 3.8–6.0 × 2.0–3.0 µm) than described by Magnusson. Otherwise, *P. oligospora* differs from *S. magnispora* primarily in having a carbonized exciple as well as carbonized accretions on the epihymenium and in lacking an epilithic thallus.

We expect the species to be more widespread in Turkey although its global distribution is an open question. As with all species described from a single specimen, we expect the variation to be better understood in the species as new collections are accumulated.

Acknowledgements

Harrie Sipman (B) and James C. Lendemer (NY) are thanked for reviewing this paper. Zekiye Kırış is thanked for organizing the field excursion and her help in collecting.

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